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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------------|--------------------------|
| 10/072,341 | 02/07/2002 | Bernard P. Breen | 020053 | 4279 4 |
| 23464 | 7590 | 08/29/2003 | | |
| BUCHANAN INGERSOLL, P.C. ONE OXFORD CENTRE, 301 GRANT STREET 20TH FLOOR PITTSBURGH, PA 15219 | | | EXAMINER | MEDINA SANABRIA, MARIBEL |
| | | | ART UNIT | PAPER NUMBER |

1754

DATE MAILED: 08/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-----------------|--------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/072,341 | BREEN ET AL. |
| | Examiner | Art Unit |
| | Maribel Medina | 1754 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 07 February 2002.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-15 is/are rejected.
- 7) Claim(s) 6 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2,3</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:
 - a. In page 3, line 1, "dire", should be changed to --direct--.
 - b. In page 12, line 21 and page 13, line 7 the identifier "10" has been used to identify the furnace, however, in Figure 7, "10" refer to the injectors (See page 10, line 1).
 - c. In page 13, line 1, "34" has been used to identify the fan on Figure #7. "34" should be changed to --40--.
 - d. In page 13, line 1, "00", should be deleted.

Appropriate correction is required.

Claim Objections

2. Claim 6 is objected to because of the following informalities: in line 2, after "burners", --to-- should be inserted. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
4. Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for oxidizing mercury with chlorine to $HgCl_2$, $HgCl$, and HgO (See page 8, first and second paragraphs) does not reasonably provide enablement for oxidizing mercury with ammonia (instant claims 1 and 7), urea (instant claim 3) or carbon monoxide (instant claims 4, 5.

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and 6). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

Claims 1 and 7 recite the use of ammonia; claim 3 recite the use of urea; and claims 4,5 and 6 recite the use of carbon monoxide to oxidize the mercury in the flue gas. The specification does not provide support for the oxidation, e.g. reaction, of mercury with any of ammonia, urea or carbon monoxide. Page 8 of the instant specification clearly discloses that chlorine is the mercury oxidizer. Ammonia, urea, and carbon monoxide are not forming part of the reaction, therefore the claims lack support for the instantly claimed limitations. Note, that ammonia, urea and carbon monoxide as described in the specification appear to indirectly affect the mercury oxidation by affecting the chlorine concentration in the exhaust gases (See page 9, second paragraph and page 11, second paragraph).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 7, 10, 11, 12, 13, 14, and 15 are rejected under 35 U.S.C. 102(b) as anticipated by US Patent No.6,146,605 (Spokoyny) as evidenced by US Patent 6,136,281 (Meischen et al) and US Patent No. 6,357,367 (Breen et al).

Instant claims 1 and 7, have been rejected under 35 USC 112, first paragraph above. The specification does not provide enablement for the limitation that reads “the ammonia being

introduced in sufficient amounts to oxidize mercury within the flue gas", however, for purposes of the following rejection, the limitation has been interpreted by the examiner as ammonia affecting the concentration of chlorine in the flue gas, and chlorine being the mercury oxidizer (See specification page 8, 1st and 2nd paragraph; page 9, 2nd paragraph; and page 11, 2nd paragraph).

Spokoyny discloses a method for the treatment of flue gases produced by combustion devices comprising a first temperature zone having a temperature in the range from 1600°F to 2100°F (See Figure (39) and col. 7, lines 34-35) and injecting ammonia in a second temperature zone having a temperature in the range from 300 °F to approximately 1000°F (See figure, (22), and (52); col. 1, lines 5-15; col. 7, lines 45-50; and col. 8, lines 1-5) and then passed through a particle removal device (See Figure 1 (28) and col. 6, lines 34-46).

Spokoyny is silent in regards to the removal of mercury or metals from the exhaust gases.

Meischen et al is relied upon as evidence to show that a typical flue gas from fossil fuel and waste combustion processes contain the following compounds "NO_x, O₂, H₂O, CO₂, CO, SO₂, HCl, Cl₂, H₂S, NH₃, volatile metals, and mercury" (See col. 8, lines 50-57).

The removal of mercury or other volatile through their oxidation metals would have been inherently provided in Spokoyny process once the ammonia is injected in the second temperature zone of Spokoyny, as instantly claimed, since Spokoyny et al flue gas inherently contain mercury and other volatile metals; along with Cl₂ and HCl. The ammonia will inherently affect the concentration of chlorine present in the flue gas, thereby affecting the oxidation of mercury.

Spokoyny is silent in regards to the temperature at the combustion zone.

Breen et al is relied upon as evidence to show that the temperature in coal combustion devices at the combustion zone is typically above 3000°F (See col. 4, lines 55-60).

Note that the secondary references (Meishen et al and Breen et al) are only provided as evidence. "To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence. Such evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." (See *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ 2d 1746, 1749 (Fed. Cir. 1991)).

Regarding the limitation of claim 1, that reads "the ammonia being introduced in sufficient amounts to oxidize mercury within the flue gas" (See interpretation above).

Spokoyny discloses in col. 9, lines 9-19, that ammonia is diluted to a concentration range from 3 to 10 %, this concentration range meets the instantly claimed limitation of "sufficient amounts".

Regarding claim 7, in the figure of Spokoyny it is seen that the ammonia is injected (70) prior to passing the flue gas through the second temperature zone (22, 52).

Regarding the limitation of claim 10 that reads, "introducing a material into the flue gas that controls free radical Cl when the flue gas passes through the second temperature zone in sufficient amounts to oxidize the metals within the flue gas".

This limitation would have been inherently provided in Spokyony process once the ammonia (instant material) is injected in the second temperature zone of Spokoyny, as instantly claimed, since Spokoyny flue gas inherently contain chlorine containing compounds such as HCl

and Cl₂. The ammonia will inherently affect the concentration of chlorine present in the flue gas, thereby affecting the oxidation of mercury

Regarding the limitation of claim 13 that reads, "introducing a material into the flue gas that affects the flue gas in a manner to optimize Cl oxidation of elemental metals in the second temperature zone in".

This limitation would have been inherently provided in Spokyony process once the ammonia (instant material) is injected in the second temperature zone of Spokoyony, as instantly claimed, since Spokoyony flue gas inherently contain chlorine containing compounds such as HCl and Cl₂ which oxidize metals such as mercury. The ammonia will inherently affect the concentration of chlorine present in the flue gas, thereby affecting the oxidation of mercury

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maribel Medina whose telephone number is (703) 305-1928. The examiner can normally be reached on Monday through Friday from 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (703) 308-3837. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Maribel Medina
Examiner
Art Unit 1754

MM